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living safely with propane appliances



Ministry of
Consumer and
Commercial
Relations
Ontario

Cottagers, campers and backyard barbecue enthusiasts know propane can be an efficient fuel for cooking, refrigeration and lighting. But you should also be aware that the careless use of propane or propane-burning appliances can be a serious hazard.

The Fuels Safety Branch of the Ministry of Consumer and Commercial Relations has prepared this booklet to provide you with a better understanding of your propane equipment. Keep it as a reference guide. Should you encounter any questions or problems not covered in this booklet, consult a dealer or service organization that employs certified propane fitters.

Topics covered in this booklet include:

1 Understanding propane

2 Propane barbecues

3 Propane and recreational vehicles

4 Propane refrigerators

5 Propane motor vehicles

This booklet is presented as a guide only. For official requirements, refer to the Ontario Propane Storage, Handling and Utilization Code, which is available from the Canadian Gas Association (416) 447-6465.

Understanding propane

Is propane dangerous?

Used with care, propane is a safe and convenient fuel. Propane gas is neither toxic nor injurious to you, should you be exposed to it in small quantities. However, should a leak occur, the accumulation of propane gas can become dangerous.

Because propane is heavier than air, it tends to settle in the lowest available place. Very small amounts of propane are required to create a flammable mixture of gas and air.

In the limited space of a recreation vehicle, for instance, very little propane is needed to create a hazardous situation.

How important is ventilation?

Propane requires a large volume of air to burn properly. In fact, 23.5 cubic feet of air is needed to burn just one cubic foot of propane. With adequate ventilation, an operating burner gives off a number of harmless products such as carbon dioxide and water vapor. But a propane appliance starved of oxygen can quickly produce dangerous amounts of carbon monoxide.

For safety's sake, use your propane appliance only for the purpose for which it was designed. Don't, for example, use a stove as a space heater.

What are the symptoms of carbon monoxide poisoning?

Carbon monoxide is colorless, odorless and extremely toxic.

Unconsciousness and death can result from prolonged exposure to the carbon monoxide produced by a malfunction or misuse of a combustion device. Poor ventilation will increase the risk.

If any of the following symptoms should develop, get into the fresh air immediately.

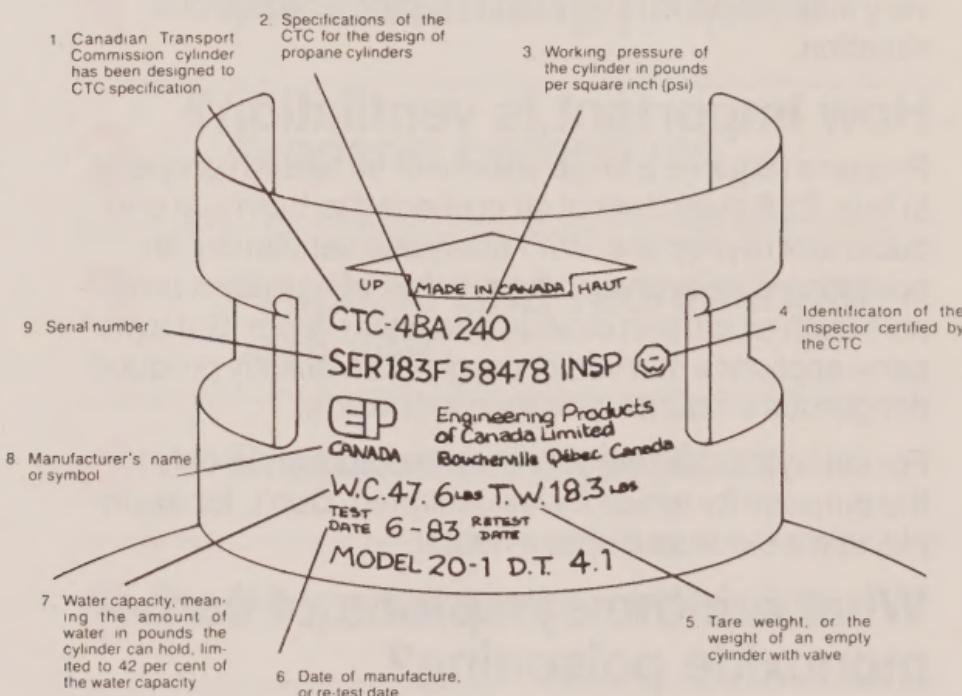
- headaches and tightness across the forehead and temples;
- weariness, weakness, dizziness and nausea;
- loss of muscular control;
- watering and smarting of the eyes.

How is propane stored?

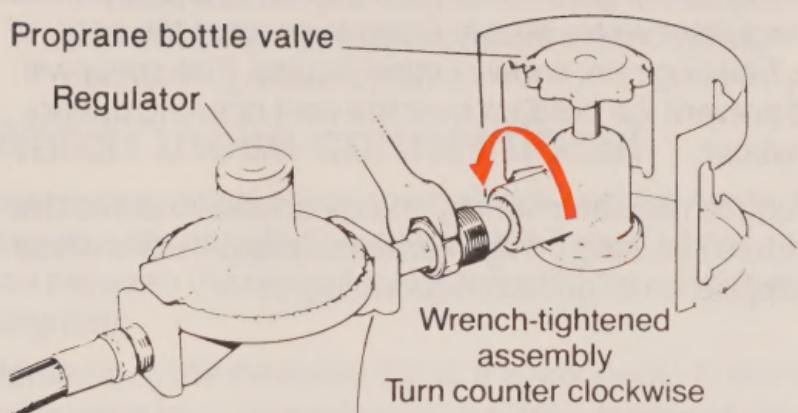
For recreational use, propane is generally sold and stored in a cylinder. Assuming it is kept in good condition, the cylinder can be refilled indefinitely. When properly filled, a cylinder has about 80 per cent of its volume occupied with liquid propane. The space above the liquid, to the top of the cylinder, contains propane vapor.

An overfilled cylinder is no bargain. Sufficient space must be left in the cylinder to permit expansion of the liquid propane, if the cylinder is exposed to warmer temperatures. Without this space, the "relief valve" may open and discharge propane, creating a potential safety hazard.

The collars of propane cylinders carry markings indicating that cylinders have been manufactured to an acceptable specification. The following information will be found:



- CTC: Canadian Transport Commission;
- DOT: Department of Transportation;
- 4B or 4BA: specifications of the CTC for the design of propane cylinders;
- 240: working pressure of the cylinder in pounds per square inch (psi);
- TW: tare weight - weight of the empty cylinder with valve;



- WC: water capacity - the amount of water in pounds the cylinder can hold, filling is limited to 42 per cent of the water capacity;
- date of manufacture, or, where applicable, retest date;
- manufacturer's name or symbol;
- inspector's initials indicating the cylinder was inspected by an inspector certified by CTC/DOT; and
- serial number.

Some cylinders may also show the number of pounds of propane.

A properly filled cylinder should weigh the sum of the tare weight plus 42 per cent of the water weight (WC) capacity of the cylinder. For example, a 20-lb. cylinder has a water capacity of 48 lb. The cylinder's weight after proper filling should be the tare weight plus $42/100 \times 48$ lb. which works out to the tare weight plus 20 lb.

The relief valve on a propane cylinder will start to discharge at approximately 375 psi (pounds per square inch) pressure.

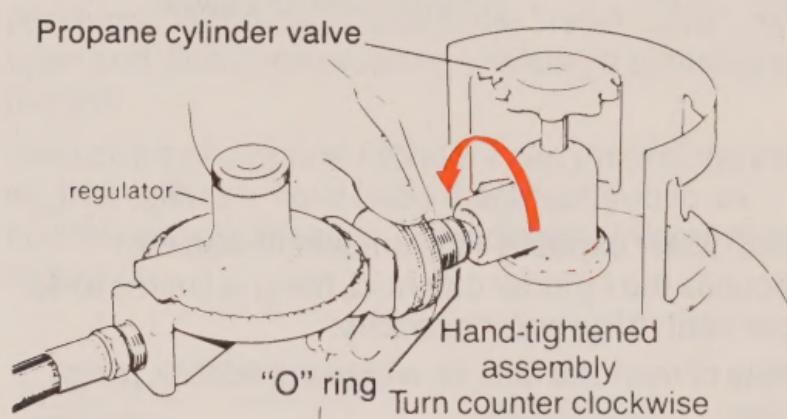
All propane cylinders are required to be recertified every 10 years starting with the date of manufacture to determine if the cylinder can remain in service. This is law throughout Ontario. It is unlawful to fill a cylinder that is overdue for recertification.

The regulator

The regulator is designed to reduce the gas pressure from the cylinder and maintain a constant pressure for delivery to an appliance.

A regulator should always be installed with its vent opening pointing downwards. If this isn't possible, cover the regulator with a proper cover to prevent the entry of rain, freezing rain, snow or other liquids. The cover will also prevent ice build up over the vent opening during the winter.

A plugged regulator vent opening can cause excessive pressure resulting in high flames and explosions when the appliance is ignited or operating.



How should cylinders be handled?

The following safety rules apply to the handling of propane cylinders:

- Never refill a cylinder that is damaged, leaking or corroded.
- Never put a cylinder in place for use without making sure it is secure.
- Always keep a cylinder upright.
- Never put a propane cylinder in a closed vehicle. When transporting it, secure the cylinder in an upright position to prevent tipping. If transporting in the trunk, block the trunk lid open. If transporting within the passenger compartment, leave the windows open. In either case, a special plug should be threaded into the outlet of the service valve and remain in place whenever the cylinder is not in use. This plug, made of metal or plastic, is designed to prevent a leak of propane should the valve be accidentally turned on.
- Cylinders are painted in light-reflecting colors. If you must repaint them, do not use dark or flat colors which absorb heat. This could cause the propane liquid to expand and be released through the safety valve.
- Never take a propane cylinder indoors if it contains, or has contained propane. This is dangerous and unlawful.

- When purchasing a new cylinder, be sure that it is the size that fits your appliance bracket. Check that all valves on appliances are closed before connecting a new cylinder.

Watch those connections!

When connecting a propane cylinder, use a properly fitting wrench (not pliers) to tighten the threaded connection between the regulator and the cylinder valve (see diagram).

Remember, the threaded fitting that connects to the cylinder valve has to be turned to the left (counter-clockwise) to tighten. Some older connectors have a hand wheel requiring only hand tightening. Always ensure that the rubber "O" ring is in good condition and in place before connecting to the cylinder valve. The "O" ring is a small rubber-like washer that fits into a groove in front of the threads. Double check this connection when you are doing your "soap and water" leak test (see below). Replace a worn, damaged or crooked "O" ring with a new one which may be obtained from your propane supplier. Some new connectors are the quick-connect type which do not require the use of tools.

Ensure all connections are leak tight before operating your propane appliance.

Can leaks be detected?

Propane is both odorless and colorless when produced. However, to make the presence of propane detectable, an odor-producing substance is added to it by the propane producer. This odorant has a distinctive "rotten cabbage" smell, which is consumed and not noticeable when a burner is operating.

If you detect such an odor, don't light a match or turn an electrical switch on or off. Turn off the cylinder valve, ventilate the area and search out the source of the leak.

Your propane system should be checked periodically for leaks even if the characteristic rotten cabbage odor is not detected.

Check for leaks

Before using a propane appliance, particularly if you have just connected a cylinder to it, check for leaks using the following method:

- (a) Make up a soap and water solution.
- (b) Turn the cylinder valve on with the appliance valve off.
- (c) Spread the soap and water solution over the hose and the connections with a paint brush.

- (d) Any leaks will result in bubbles forming in the solution.
- (e) If a leak is indicated, shut off the cylinder valve.
- (f) Repair any leak by tightening the fitting or replacing the "O" ring.
- (g) Repeat (a), (b) and (c) until no leaks are indicated before operating the appliance.
- (h) If you cannot stop the leaks, consult a certified propane fitter.
- (i) Never go over connections looking for leaks with a match, cigarette lighter or any other flame.

Disposal or recertification of out-dated propane cylinders

Refillable propane cylinders are used in many applications today. The most popular size is the 20-lb. propane cylinder used on many backyard barbecues.

A propane cylinder is required by law to be examined and recertified at 10-year intervals, beginning from the date of original manufacture stamped on the collar of the cylinder. It is illegal to fill a propane cylinder older than 10 years that has not been recertified. This law is for your safety.

Corroded or damaged propane cylinders could leak propane. Outdated relief valves may not operate as intended. Either of these conditions could lead to a fire or explosion.

Should your propane cylinder be 10 years old, you, as an owner, have one of two choices - either disposal or recertification. If you wish to have your propane cylinder recertified, your propane supplier will arrange to have the cylinder recertified and date stamped if it complies with the requirements. A fee will be charged. Your propane cylinder, when recertified, is good for another 10 years of service. Do not attempt to dispose of a cylinder by putting it in the garbage. Take the cylinder to your propane supplier for disposal.

Propane barbecues

While propane barbecues are cleaner and faster than charcoal, they do present a potential hazard to the care-less user.

When assembling the unit, follow the manufacturer's instructions carefully. If in doubt, take it back to the dealer or call a certified propane fitter.

A little extra care and these simple precautions should ensure the safe and enjoyable operation of your barbecue.

- Make sure the burner ports are free of rust or dirt and that the burner orifice is clear of dust or cob-webs (see manufacturer's instructions).
- Check that the hose is in good condition. A damaged or cracked hose can send out a jet of propane which, if ignited, could result in a flame several feet long.
- Place your barbecue outdoors. When it is operating, it must be at a distance to combustible mate-rials, not less than that shown on the manufacturer's plate attached to the barbecue. It should not be close to a wooden fence or wall or beneath a combustible roof, overhang or even a low tree.
- When lighting your barbecue, have the match or taper already burning and the lid open before you turn on the propane. Make sure flame is visible at the burner ports after lighting.
- The barbecue cylinder must be three feet away from a building opening.
- Never move the barbecue while it is lit.
- Turn off both the appliance "on-off" valve and the cylinder valve at the conclusion of each use.

Read and follow the manufacturer's instructions care-fully and enjoy a safe barbecue season.

Check the labels before buying

When you purchase a propane barbecue be sure it car-ries the symbol of one of the following organizations to ensure the product has been tested and complies with Canadian standards

- Canadian Gas Association (CGA)
- Canadian Standards Association (CSA)
- Underwriters' Laboratories of Canada (ULC).

Use with care

A propane barbecue must only be used outdoors. If you take your barbecue indoors for storage, remove the cylinder and store it outside. It is unlawful to store a propane cylinder which contains or has contained propane indoors.

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Propane and recreational vehicles

Propane equipment is found in a wide variety of recreational vehicles, such as:

- travel trailers;
- motorized homes;
- slide-in campers;
- chassis-mounted campers;
- tent trailers; and
- sport vans.

The location of the equipment varies, depending on the type of recreational vehicle involved. There is one safety principle, however, that applies equally to all types of recreational vehicles; cylinders, their relief valves and regulating equipment must be situated to ensure any leaks dissipate outdoors. Propane storage/regulating equipment is located outside the vehicle or in a compartment gas-tight to the interior of the vehicle and ventilated directly outside.

Cylinders and regulating equipment are located depending on the type of vehicle, as follows:

- in travel trailers and tent trailers, on the "A" frame as close to the front of the trailer body as possible;
- in motor homes, slide-in and chassis-mounted units, in a recessed compartment accessible only from and ventilated to the outdoors (the compartment must be gas-tight to the interior of the vehicle);
- in vans, in a cabinet located inside the vehicle having a properly gasketed (sealed) access door and a 1 1/4-inch vent tube directed down and to the outside.

Cylinders mounted on the roof of a vehicle are neither safe nor acceptable. Those mounted on the back of a vehicle are also unacceptable unless substantial protection to the cylinder is provided in the event of a rear-end collision.

Only a certified propane fitter may lawfully install or remove propane piping, tubing, equipment and appliances in your unit.

How is propane distributed in the vehicle?

Propane is carried from the regulating equipment, usually through a CGA-certified flexible hose connector of 24 to 30 inches in length, to either a metal pipe or copper tube supply line.

This supply line must be properly supported and fastened underneath the vehicle by brackets, hangers or clips at intervals no greater than four feet.

Where it comes in contact with or passes through a structural member of the vehicle, protection in the form of a rubber grommet is provided, to prevent wear.

Connections in the propane supply line within the passenger space of the vehicle, with the exception of the one connection required for each appliance, are not permitted.

Propane appliances

Should you wish to purchase an appliance for your recreational vehicle, be sure that it is certified for this use and that it carries one of the following logos on the rating plate:

- Canadian Gas Association (CGA)
- Canadian Standards Association (CGA)
- Underwriters' Laboratories of Canada (ULC)

These testing agencies are recognized throughout Canada.

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Propane refrigerators

Underserviced or poorly maintained propane refrigerators can be dangerous.

Propane refrigerators which vent inside a building are so dangerous the Fuels Safety Branch banned their sale and installation in Ontario. The only type that may now be installed vents directly to the outdoors.

If you have one of the older indoor-venting models, you are strongly urged to have it moved outdoors. Any loss in convenience will be more than offset by reducing a serious threat to you, your family and friends. Or, you may wish to buy a new refrigerator which vents the exhaust outside the building.

Lethal quantities of carbon monoxide can result from a refrigerator flame that is improperly adjusted or partially blocked by dirt. For your safety, a propane refrigerator must receive proper attention by a certified propane fitter.

Contact your propane supplier for servicing and cleaning.

Be sure your refrigerator is cleaned and adjusted every year. Never start a propane refrigerator at the beginning of a season without first making sure it has been serviced.

The burner must also be cleaned immediately after the refrigerator has been relocated, regardless of the distance. This ensures the burner is free of any scale deposits that may have been dislodged from the flue passage.

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Propane motor vehicles

As the owner or operator of a propane-fuelled vehicle, it is important that you follow some simple guidelines for its safe use and operation.

Refuelling

At public filling stations, refuelling of a propane-powered motor vehicle must be carried out by a person with a Fuels Safety Branch, Ministry of Consumer and Commercial Relations, certificate.

Never ask the attendant to "top-up" the propane tank. The maximum filling capacity of the tank is 80 per cent as space must be left for expansion, which will occur if the propane is warmed up. Overfilled tanks may release hazardous amounts of propane through the relief valve.

During refuelling, make sure the ignition is turned off, no one is smoking within 10 feet of the filling point and if you have appliances on your vehicle, turn off all burners and pilot lights. At the completion of the refuelling, make sure the attendant has closed the bleed valve and replaced the filler-valve dust cap.

Servicing and operation

Never install, service or replace propane fuel-system components yourself. This must be done by a certified propane fitter. Never weld or use a torch on or near the fuel tank, fuel lines or fittings. If you suspect there is a leak in the system, ensure the ignition is off, extinguish all sources of ignition, do not operate electrical switches and turn the supply valve on the fuel tank to the fully closed position if this can be done safely. Open building windows and doors if the vehicle is indoors. If the leak continues leave the area and warn others to do the same and immediately notify your local fire department of the problem.

When parking the vehicle indoors for two weeks or longer, close the supply valve at the tank completely. When opening the supply valve, open it slowly and all the way.

If parked indoors and your vehicle fails to start after a few tries, do not continue to try to start the vehicle without ventilating the area. Otherwise, propane may accumulate in dangerous quantities.

If your vehicle hits a curb or strikes an object, or if you suspect a leak, check for leaks and damage to the propane system. Brush a soapy water solution over all connections, fittings and hoses to check for slow leaks. If bubbles form, you have a leak which must be repaired by a certified propane fitter.

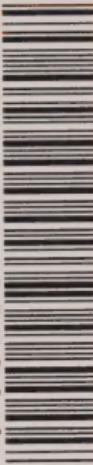
For additional information contact:

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